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An unusual new record of *Typhlocaris salentina* (Caroli, 1923) (Decapoda: Typhlocarididae) from subterranean water of Apulia (Southern Italy)

Abstract - In December 1995, three large females of *Typhlocaris salentina* were collected in an artificial well located in the basement of a building in downtown Bari, when the well was dried out for maintenance works.

The present finding extends the known range of *T. salentina* northwards and definitively proves the prawn is not restricted to the Salento subterranean water system, but is also present in the lower Murge karst system.

Key words: *Typhlocaris salentina*, Decapoda, Typhlocarididae, troglobious fauna, Italy.

Riassunto. - Nuova ed insolita segnalazione di *Typhlocaris salentina* (Caroli, 1923) (Decapoda: Typhlocarididae) nelle acque sotterranee della Puglia (Italia meridionale).

Si segnala la cattura di tre esemplari adulti di *Typhlocaris salentina* in un pozzo ubicato nello scantinato di un edificio nella città di Bari. Si conferma quindi la presenza di questa specie troglobia, endemica della Puglia, anche nel sistema carsico delle Murge, oltre che nel sistema carsico del Salento.

Sulla superficie della cuticola di tutti e tre gli esemplari sono state osservate loriche di Foliculinidi, una famiglia di Ciliati mai segnalata in precedenza in Decapodi troglobi.

Parole chiave: *Typhlocaris salentina*, Decapoda, Typhlocarididae, fauna troglobia, Italia.

Introduction

The palaemonoid genus *Typhlocaris* Calman, 1909 includes 3 troglotic freshwater species restricted to the Mediterranean area (Holthuis, 1986).

Two species are known from their type localities only: *T. galilea* Calman, 1909 from a pool fed by a mineral spring at Tabgha, Northern shore of the Lake Tiberias (Israel) and *T. lethaea* Parisi, 1921 from a subterranean lake in a cave near Bengazi (Lybia).

The third species - *T. salentina* Caroli, 1923 - originally described from the small pool (Cocito) inside the Zinzulusa cave near Otranto, Southern Italy

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(Caroli, 1923, 1924), was subsequently found in two other caves (Grotta dei Diavoli and L'Abisso) within the Salento karst system (Ruffo, 1957) and in an artificial well located 40 km NW of Brindisi, 850 m from the seashore, within the Southern Murge karst system (Ariani, 1982). Very recently another specimen has been reported from a well located 15 km SE of Mola di Bari, 1.5 km from the seashore (Inguscio *et al.*, 1999).

Material and methods

In December 1995, three large females of *T. salentina* (c.l. 18.2 - 21.4 mm) were collected from an artificial well, located in the basement of a building in downtown Bari, "Muratiano" neighbourhood, about 1 km from the shore-line, when the well was dried out for maintenance works.

The artificial well has a diameter of 70 cm and is protected by an iron cover. The water-bearing stratum feeds the well through a water spout. Water temperature (17°C) is nearly constant all year round, suggesting it originates from a deep aquifer.

The well owner (Mr. Mongelli), surprised by the unusual finding, froze the prawns and brought them to one of us (N.U.). The specimens (Fig. 1), now stored in alcohol, are deposited in the reference collections of our Institutes.

It is worth noting that also the other Italian troglobitic shrimp *Troglocaris anophthalmus anophthalmus* (Kollar), present with several populations in the karst system of NE Italy, Slovenia and Croazia, was once collected accidentally with a bucket from an artificial well in the town of Pola, and donated to the Trieste Natural History Museum (Müller, 1931).



Fig. 1 - *Typhlocaris salentina* collected in December 1995 from the artificial well in Bari (preserved specimen).

Fig. 1 - *Typhlocaris salentina* raccolta nel Dicembre 1995 in un pozzo artificiale nella città di Bari (esemplare conservato).

Results and discussion

Present material of *T. salentina* was compared with two male specimens from the Zinzulusa cave (type locality) in the I.R.Pe.M. reference collection.

All the females from the Bari well, and also the smallest male from the Zinzulusa cave have unpigmented eyes, whereas a narrow strip of black pigment is still evident in the eyes of the largest male from the Zinzulusa cave, after twenty years storage in alcohol.

Caroli (1924), in the description of *T. salentina* mentioned the presence of ocular pigment among the characters that differentiate this species from the closely related *T. lethaea*. Ariani (1982) reported unpigmented eyes for the specimen collected in an artificial well south of Torre Canne (Pozzo Difesa di Malta) and for part of the topotypic material available to him suggesting the presence of ocular pigment is not a diagnostic character. A positive reaction of the prawns to a narrow light beam was observed in the Zinzulusa cave by Scaramella (1971).

Caroli differentiated *T. salentina* from *T. lethaea* on a series of ratios between segments of the chelipeds.

Measurements taken on the three Bari females and on the two Zinzulusa males are listed in Table 1. Second chelipeds in *T. salentina* are subequal and measurements refer to the largest one.

Ratios among pereopod segments show considerable variability (see Table 1), as mentioned by Parisi (1921) for *T. lethaea*.

All five specimens examined have the first pereopod with the dactylus less than twice the length of the palm, and the carpus equal or less than 1.5 times the length of the chela, as stated in the original description of *T. salentina*. In the largest second pereopod, dactylus length ranges between 1.5 and 2.0 times the palm length.

Table 1 - Biometrical data (mm) recorded from the specimens of *Typhlocaris salentina* collected in Bari (new record) and in the Zinzulusa cave (type locality).
Tabella 1 - Dati biometrici (mm) rilevati sugli esemplari di *Typhlocaris salentina* raccolti a Bari (nuova segnalazione) e nella grotta Zinzulusa (località tipica).

Locality	Bari	Bari	Bari	Zinzulusa cave	Zinzulusa cave
Sex	F	F	F	M	M
Carapace length	19.0	21.5	18.4	21.7	11.0
Pereopod I Dactyl length	4.2	4.3	4.0	4.3	2.0
Pereopod I Palm length	2.1	2.2	1.8	2.3	1.3
Pereopod I Carpus length	8.5	8.8	7.1	10.3	4.1
Pereopod II Dactyl length	19.0	19.1	17.8	24.0	7.5
Pereopod II Palm length	10.5	12.3	9.0	14.4	5.0
Pereopod II Palm width	3.6	5.0	3.3	5.3	2.2
Pereopod II Carpus length	8.2	8.3	6.8	10.0	3.5
Pereopod II Meros length	16.1	16.1	14.4	19.4	6.5
Pereopod V Carpus length	8.8	8.6	8.1	11.6	4.5

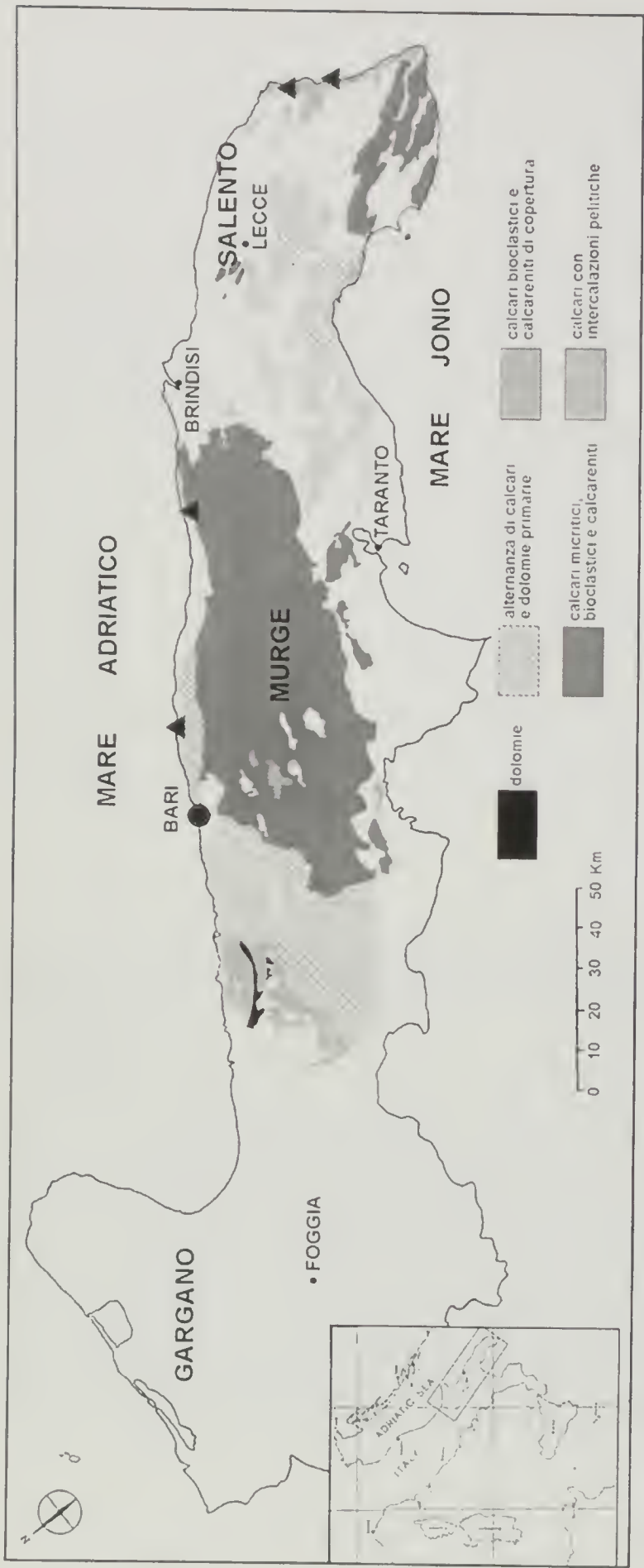


Fig. 2 - Distribution of *Typhlocaris salentina* (● present record, ▲ previous records), superimposed to the extent of carbonatic lithological facies in the Southern Apulia (Murge and Salento) redrawn after Cotecchia (1977).

Fig. 2 - Distribuzione di *Typhlocaris salentina* (● segnalazione attuale, ▲ segnalazioni precedenti); estensione delle formazioni carbonatiche nella Puglia meridionale (Murge e Salento), ridisegnata da Cotecchia (1977).

Differences in the length of 5th pereopod carpus and merus observed between Bari and Zinzulusa specimens may be a sexually related character.

All three specimens collected in the Bari well were parasitised by a loricate ciliate at the surface of carapace, abdomen and antennal basal segments. As the shrimps were initially frozen, the loricae only are preserved and based on their shape, the ciliates have been attributed to the family Folliculinidae. Finding of the "folliculinid" is also of great interest as no representative of this group was previously known, to our knowledge, from troglobious decapods. Unfortunately the temporary freezing of the specimens resulted in partial destruction of the hosts, making their identification below family level impossible.

Whereas in all other localities *T. salentina* was collected in water bodies with salinity ranging from 1.5 to 5.4 ppt, water flowing in the Bari well is almost fresh (salinity 0.5 ppt). The capacity of another member of the genus (*T. galilea*) to adapt to a rather wide range of salinity has been reported on by Tsurumai (1978).

The present unusual finding extends northwards the known range of *T. salentina* (Fig. 2).

Two other endemic troglobitic species originally described from the Salento karst system have recently been recorded further North (Inguscio *et al.*, 1999). The Thermosbaenacean *Monodella stygicola*, originally described from the Abisso cave, has been collected near Mola di Bari. The mysid *Spelaeomysis bottazzii*, originally described from the Zinzulusa cave and subsequently found in several localities of the Salento, was discovered in freatic wells near Mola di Bari and in Southern Murge - Pozzo Difesa di Malta - where *T. salentina* was also collected (Ariani, 1980, 1982).

These findings and geological evidence support the hypothesis of a continuity of the deep water-bearing strata between the Murge and Salento karst systems (Cotecchia, 1977), and of their underground freshwater fauna.

Acknowledgements

We deeply thanks Mr. Mongelli who collected and made available for study this interesting material and our friend Dr. Daniela Pessani, University of Turin, who confirmed our identification of the ciliates.

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Ricevuto: 25 gennaio 2001

Approvato: 5 aprile 2001